
SHOPMAN
e - point-of-work computers
HARDWARE
SHOP EXCELLERATOR
e - shopfloor software
SOFTWARE
EMPOWER
e - team
SERVICES

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Section 1
Corporate Overview

Introduction

CIMLINC, INC. is pleased to provide the following document which details the function, fit and integration of the CIMLINC - Shopfloor commercial off-the-shelf software.

Our solutions emphasize a “mechanic-centric” or “shop-floor-centric” design philosophy focused on meeting the challenges of the airline maintenance or manufacturing environment, providing a platform that is compatible with the vision of organizations today, tomorrow and in the future.

CIMLINC’s family of solutions has been developed with various industry leaders in the Aircraft Manufacturing & Maintenance Execution (AMME) segment of the Aerospace and Defense market place. CIMLINC has validated the Shop Excellerator’s feature function benefits against mainstream market requirements in both manufacturing and maintenance to maximize our customer return on investment (ROI), while minimizing the integration pains of custom applications. Shop Excellerator will provide your organization with the ability to take both commercial and technical advantage of a robust, low risk Shop Maintenance/Manufacturing Execution and Repair/Compliance Tracking System.

CIMLINC is uniquely positioned to provide real-world insight into the dynamics of delivering value benefits to the mechanic or assembly technician at the point of work while ensuring visibility and security into the day of airline maintenance or manufacturing operational performance. Based on CIMLINC’s experience gained at Delta Air Lines with an implementation process comprised of over 5,000 mechanics, the Shop Excellerator provides the flexibility in meeting the integration requirements for multiple Legacy systems and positioning for a seamless roll-out of new enterprise level information systems.

Company Background and Overview

CIMLINC® Incorporated is a software company focused on providing shop floor execution solutions for Aerospace & Defense companies worldwide. CIMLINC's Shop Excellerator (SE) creates the *Highway to the Shopfloor Day of Operations,* providing solutions for the manufacturing and maintenance repair and overhaul environments.

Founded in 1981, CIMLINC has been devoted to better understanding the problems that encompass an entire shop floor process, from the time a plan starts to take shape to the final assembled order. CIMLINC has participated in developing technology that has brought value to over 200 manufacturing operations worldwide. CIMLINC evolution mirrors that of the information technology itself in bringing innovation to the Shopfloor through the continuous adoption of the most relevant and cost effective technology to our customers. CIMLINC’s complete chronological migration from a CAD/CAM provider to the provider of the **e**-Shopfloor is laid out in this section. CIMLINC’s mission has remained the same in providing solutions to enable a better electronic workflow between all departments, managers and planners from mechanics to the supervisors, while focusing on saving valuable time and avoiding costly mistakes.

We have sharpened our focus to bring our experience to the Aircraft Manufacturing and Maintenance Execution (AMME) environment within the Aerospace and Defense Marketplace. The AMME market includes all manufacturers and maintainers of airframes, systems, sub-systems and components that make up today’s modern aircraft. By focusing on AMME, we have been able to invest in making a commercially-of-the-self solution that meets the ever increasing regulatory and compliance challenges, while providing our customers with the tools necessary to

meet their commercial objectives in the very competitive aircraft maintenance repair and overhaul market. To insure our customers achieve their objectives, we focus on creating a unique Point-of-Work relationship with the mechanic and the point-of-management value being delivered to the first and second line supervisors. The focus of these relationships is to bring visibility, verification and innovative velocity to the shop floor workers.

With the Corporate headquarters located in Itasca, Illinois, CIMLINC extends its shop floor solutions overseas with a European headquarters located in Staines, England. Sales offices are located throughout the United States and Europe.

Business/Product Focus and Direction

The Internet is redefining how we do business. By replacing business processes with new forms of Internet enabled solutions, companies are capitalizing on the power of the Internet to reach out to larger numbers of customers, employees and suppliers. Internet technology is everywhere — *except on the shop floor*. Shop floor workers have remained untouched by the Internet revolution. While attempts have been made to place networked computers onto the shop floor, unusually complex work requirements have presented a unique set of challenges:

- The harsh environment of dust, heat, poor lighting, vibrations, sparks and airborne contaminates is harmful to computer equipment.
- Computers aren't as mobile as the shop floor workers — from squeezing inside a wing panel to scaling multi-story scaffolding.
- The need for protective gear such as gloves, helmets and goggles interferes with quick and convenient computer interaction.
- The primary job of a shop floor worker is to fabricate, assemble or repair — not to use a computer.

CIMLINC's e-business strategy is to provide the first complete, whole-product shop floor solution — e-Shopfloor. Through point-of-work computing, all of the communication, coordination and collaboration power of the Internet is available right at the mechanic's fingertips. The shop floor is plugged into the rest of the company and the entire supply chain. By providing the missing link between the shop floor and the rest of the organization, e-Shopfloor promises to cut costs, boost productivity, enforce best practices and improve business decision-making enterprise-wide.

The foundation of CIMLINC's whole-product shop floor solution is the foundation of our current SE product suite. Many man-years of effort were invested in what we call the Aerospace industry's "Process Database". This integrated data repository manages all process planning, all shop floor work packets and all non-conformance, non-compliance data. Every SE Solution module executes on top of this base.

CIMLINC's technical direction over the next three to five years is to develop, integrate and implement new technological tools built with the latest software platforms, piece by piece, into the Shop Excellerator suite. The first steps of encapsulating SE within a browser and linking functionality to Java-developed widgets have already been accomplished. Further research and development of browser-based software is underway and is proving successful. CIMLINC intends to continue this effort and will provide amendment processes for our software as our customers and we transition into complete web-enabled environments.

Section 2
Shop Excellerator – Operational Scenarios

Shop Excellerator - **Author**
Operational scenario–Defining the maintenance and production processes

The Author module of Shop Excellerator ™ is an MRO industry proven, fully functional job scoping and Computer Aided Process Planning system, that creates enterprise foundations to help mold the organization into a "Lean" enterprise.

The process begins with the job scoping or new plan creation, plan building blocks grouped by logical sub-modules or repair processes can be stored in plan libraries. These "standard libraries" define best practices and can be reused during work scope to become integral elements of "*Takt* time" analysis. Plans define the specific elements of where work is performed (department / workcenter / sub area), what informational aids (photos, sketches, videos) or blueprints are used – these can be hyperlinks to other document servers where current information resides. Hyper-linking provides the efficiency of having many plans pointing to one common reference source; this dramatically improves the incorporation of engineering changes and maintains ISO-9000 or QS-9000 certification by providing document integrity that mitigates the risk of using outdated information in product maintenance or buildup.

Plans also define who performs an operation by labor skill code definition (repair mechanic grade 1, electrician) or signature signoff based on user profile (quality assurance), and the expected operation duration (time standards setup + run). Plans can contain multiple operations for one or more departments and complex operations can be divided into multiple pages and/or multiple steps. A plan's Bill of Materials supports "Lean" parts kitting programs and is definable to the operation, step or page level, a BoM can contain non-serialized and serialized parts. Bill of Material requirements is an integral on-line view that is also printable for shipping records and exportable to commercial ERP systems such as SAP to indicate part/material consumption and replenishment records.

Perhaps the most significant organizational benefit of using SE Author as your Computer Aided Process Planning, is derived from your own organization's "span of control model". "Span of control" means the ratio of the number of workers and mechanics that use plans to repair or build products in comparison to the number of engineers that created the plans. This is generally a number such as 15 to 1 or higher. Therefore, by utilizing SE Author which defines a plan's significant characteristics such as time standards, job classifications, approval authorities, equipment requirements, etc., the foundation is created for detailed process and procedural control analysis that can be coupled with our reporting capabilities. We will further discuss the subjects of analysis and reporting features in the SE Manage operational scenario.

Shop Excellerator - Work
Operational scenario – Where maintenance and production is performed

The Work module of Shop Excellerator ™ is an MRO industry proven, fully functional electronic on-line plan instruction delivery system. Based solely on the interactions involved in completing a plan's requirements, we affect and report the effects of those actions comparing them to your strategic business objectives.

These objectives include: WIP (work-in-process) reporting, as-built record generation system, cost accounting and performance factors, manpower requirements, schedule performance monitoring, Cost-of-Quality, defect documentation and resolution records, electronic shift notes, continuous process improvements for MRO and planning instructions and turn-around-time (TAT). Having "standard plans" approved and in the system allows you to move rapidly from parts arrival at your dock to beginning the actual maintenance and repair procedure. SE Work assists everyone involved in managing your contractual commitments.

The process begins when the mechanic "logs-on" to the Shop Excellerator system, as easy as swiping a badge and inputting a PIN number. The mechanic enters a job queue (available orders) - a supervisor / cell-leader can assign jobs to an individual employee. The mechanic selects the order and "jobs-in", the system automatically records time, date and employee information. At operation completion, the expended efforts are summarized, compared to and calculated against the standard for performance, schedule and TAT reports. All of the plans' instructions text, graphics and BoM data are executable on-line. Instructions can include interactions such as recording a data capture element (cure time, part serial number, test or measurement results). The activities of others, including coordinating a quality assurance "buy-off" or witness signoff, can be facilitated by using and posting that request on our electronic callboard (which works like e-mail within the Shop Excellerator application). Sub-module plan progression is indicated and updated as the mechanic's status operations complete.

Revising the plan's operation status to complete provides instant updates to WIP records. Completion statuses can automatically notify the next department of incoming work or provide notification for parts movement requirements. These status updates can be facilitated by using a bar coding system, but it is not a requirement. The system will maintain parts tracking and TAT times with or without bar code usage. Refer to our section entitled E-tag- operational scenario for information on how using the principles of Lean Manufacturing and combining bar coding with visual color in the form of colors we can provide instant part status recognition.

When a defective part condition is discovered, the "Discrepancy" icon can be activated to generate an electronic record that documents the conditions and dispositions involved in problem resolution. Command/control features allow "lien" placements and visual indication at the operation level is provided by the presence of a "Nonconformance" icon, which indicates a defect was documented. Selecting the icon allows anyone to review its current status.

Shop Excellerator - Resolve
Operational scenario – Defect documentation and problem resolution.

The Resolve module of Shop Excellerator ™ is an MRO industry proven, fully functional electronic non-routine and nonconformance documentation and resolution system that includes closed-loop corrective action investigation processes.

The process begins with the creation of the discrepancy statement that defines the condition that requires repair. Digital photographs can be attached and illustrated with tools provided to clarify issues. Creation time is minimized and transferring all applicable header information over from the work plan maximizes accuracy. The dispositioner can place a "lien" against the plan, which effectively puts it "on-hold" until the resolution is defined. This prevents unauthorized rework and non-value added labor from being performed. The disposition is then transferred (when required) to the approval queue via the electronic callboard, even customer approval, when the customer is 3,000 miles away.

Shop Excellerator - Manage
Operational scenario – Managing the maintenance and production process.

The SE Manage application provides insight and visibility into the direct operation's performance velocity. Establishing associations between elements of the SE Oracle™ [1] database and the reporting functionality's of Impromptu™, PowerPlay™ and Visualization.™ [2] With SE Manage, you establish performance thresholds, then monitor and report the results. This allows users to make informed decisions and create action plans to maintain strategic business objectives.

The process is as simple as logging on and selecting a report button. Standard maintenance or production reports can be broken down into daily, weekly, monthly or annual events that cover work-in-process, cost and schedule variance, remaining / open items and burn down charts, total man-hour charts, labor deployment and requirements. SE Manage also facilitates graphically formatted reports to provide enhanced visualization of the data and focuses in on targeted areas.

SE Manage provides the same reporting functions for quality records as it does for maintenance and production performance reports by using the same information defined in the plans' work breakdown structure. The end item serial number, the final APU model and part number, an engine sub-module part number, a component part number from the BoM, the department which documents the defect, the responsible department or supplier number and a defect or repair code can all be utilized for trend and Cost-of-Quality analysis. One other important feature of SE Manage is that all reports can be viewed on-line without running the Shop Excellerator application, reports can be printed or sent as e-mail and are publishable to a web site intranet, internet or extranet. Dial in protection is provided for all extranet applications.

[1] Registered trademark of Oracle Corporation
[2] All registered trademarks of Cognos Corporation.

Shop Excellerator - Track
Operational scenario – Compliance, product service and warranty issues.

The SE Track application provides insight and visibility into a product's performance velocity. Associating elements in Shop Excellerator, SE Manage and the environmental operating conditions of your products (hours, cycles, achieving a max thrust limits, etc.), the information becomes homogeneous under the guidance of SE Track.

The process can be as simple as an engineer or maintenance scheduler inputting a record into the SE Track database that defines and details the affected part number and perhaps the serial number effectivity range. He then establishes the source document with which the units need to comply and the compliance date. When the corresponding Shop Excellerator WORKSCRIPTS/plans that provide detailed compliance instructions are created, the information is linked to Track. This allows the database to take control from that point forward. As we mentioned in the Work scenario, when a part arrives for standard maintenance issues, you can query the system for other compliance based work requirements. When they match, you can offer these additional services to your customers. You not only benefit from additional work, but the "standard plan" details the cost and schedule impact. Knowing this information up front allows you to maintain your premier customer service and enhance your reputation for supplier excellence.

SE Track serves as a compliance issues data warehouse by storing product and part specific information on relevant issues such as parts conformance to Airworthiness Directives, Service Bulletins, life limits, plus any limits on its sub-components. For Reliability Engineering and Warranty analysts on contracts where field data is supplied by the customer regarding the product's operating climate, SE Manage can be used to establish threshold levels to report performance and occurrence driven events automatically, as well as, report on the breadth of the scope an AD covers based on a part number or serial number range to provide a report that shows which units are conforming or outstanding, while providing that watchful eye on the compliance date. Restating one of the important features, we can accept field data input from the web as well as view, publish and support data reporting queries in your web environments.

Shop Excellerator - E-tags
Operational scenario – visual control, instant status recognition and bar coding

The concept of the E-tag is straightforward and easily adaptable to your maintenance and repair activities and manufacturing applications. E-tag serves as the link between the physical world of parts movement and the computer world (that which contains information concerning the parts status or current condition). E-tags by their very nature are made to represent different conditions that are instantaneously recognizable, intuitive and utilize the speed and power of bar coding to retrieve detailed information. E-tags are available in different shapes, such as circles, squares, triangles, octagons, etc. and different colors, such as red, blue green, yellow, etc.

Using E-tags is an easy-to-follow, highly repeatable process. For example, during a routine inspection of an APU returned for overhaul, the dimension on the APU shaft is now –0.05" to blueprint in the unit's compressor section. Using the Resolve module, the part number and the condition of the part is entered into the system. The inspector attaches a RED circular E-tag indicating that a non-conforming condition exists on this part, places it on a shelf marked "needs engineering", scans the pre-printed bar code

and associates it to the Resolve document they created. At anytime during the process, scanning the E-tag will retrieve the associated information and display the current tag status. E-tags eliminate paperwork that attaches to the part; hence, no more lost paperwork and no more wondering who has the paperwork. Just scan the tag and retrieve the information. Access to all of the database records, the people involved, the labor hours performed, the work instructions and the results are all electronically recorded and stored.

E-tags are available in different colors and shapes to represent different processes as well: parts move notices, serviceability, scrap, under warranty claim, hold for test, etc. E-tags are a natural extension of the powerful Shop Excellerator database and the benefits provided by accurate, instantaneous searching. A query can reveal whether similar conditions have previously existed and the frequency of their occurrences. The database aids in the formulation of standard repair procedures with insight into the repairs' effectiveness over the part's life and its operating environment This insight leads to informed parts repair decisions, which ones to replace and which ones are candidates for redesign to improve product performance and reduce the life cycle costs of maintaining it.

SE-Inspector
Operational scenario – documentation, resolution and coordination

SE Inspector is facilitated by the easy-to-use "Palm" operating system and is a lightweight, highly portable hand-held computing device designed to facilitate rapid and accurate records generation, those issues traditionally called shakedown records or pickups. The device has an integrated bar code scanner, which facilitates E-tag transactions. The scanner is also 2D-barcode compliant and can read any attached part data history tags. The SE Inspection device creates electronic shakedowns and pickup records faster than current paper processes, benefiting your organization by providing accurate cost of quality records, total labor expenditures, database records for root cause analysis, etc. SE Inspector focuses the proper balance of features, functions, performance and portability to provide automated solutions to harvest your entire product cycle costs. In today's competitive marketplace, world-class operations require more and more computing power that are focused on maintaining current and approved methods, rules, regulations and specifications. The demand to do more with less is no longer an accurate paradigm, "Sweat and longer hours are not the answer, but will be employed if no one knows how to work smarter." [3] SE Inspector keeps your operations moving and increases the accuracy of efforts that go into producing goods and services. With this new layer of information, continuous improvements become viable to maintain world class performance.

The process of using SE Inspector can begin when a part arrives at the receiving dock. SE Inspector can create an electronic receiver transmittable via the web or as email back to the customer that acknowledges part receipt. It can then retrieve a part's standard router (based on part & customer number) and launch the initial work order into Shop Excellerator. The creation of the order starts the database clock, which monitors turn around time (TAT). The system monitors the amount of time it takes the part to process to its job/work scope operation, providing an accurate picture of direct labor and

[3] Lean Thinking, Womack, James P., Jones, Daniel T., Simon & Schuster 1996.

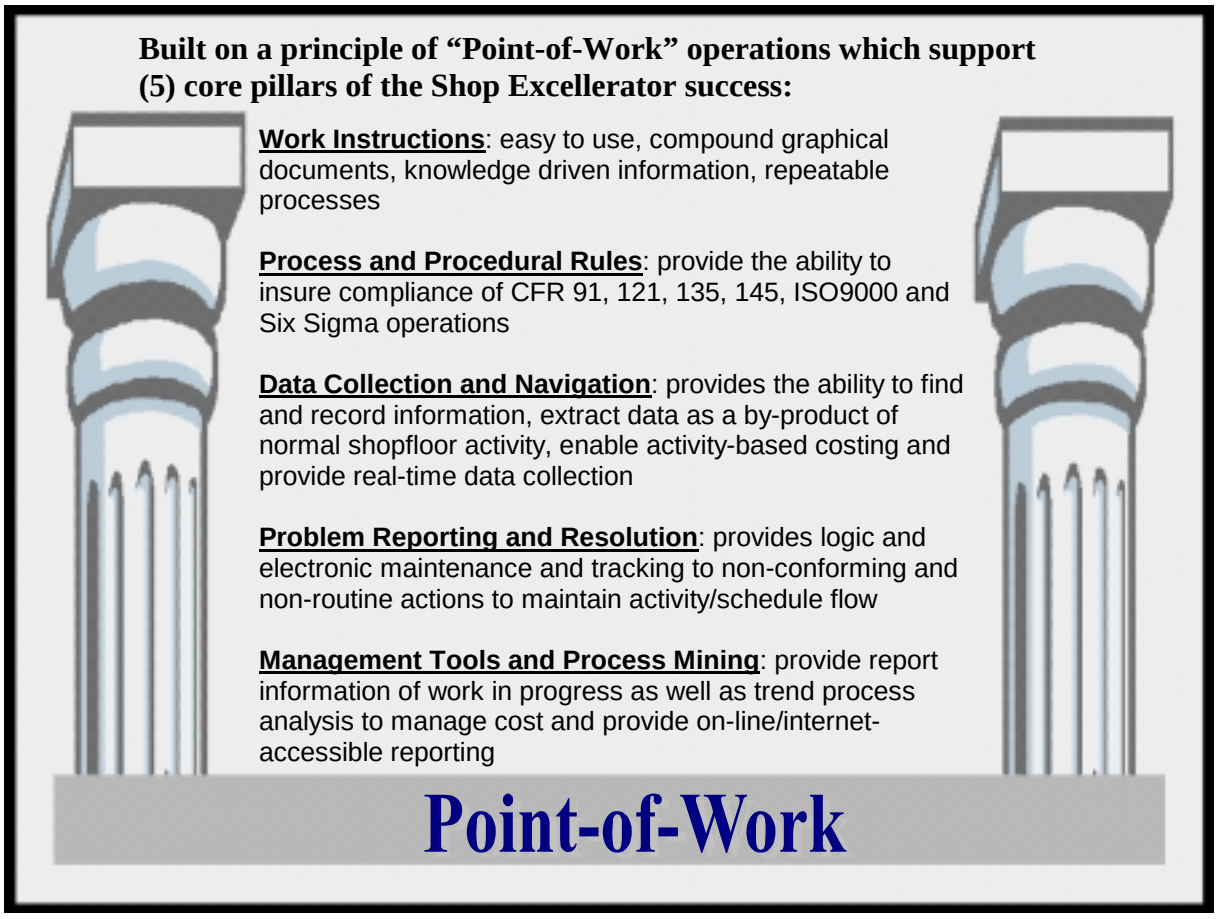
queue time (wait and transportation time) hours as it was processed through the operations.

SE Inspector also provides quality assurance personnel with the ability to move about the shop to witness and sign off work requirements. Electronic callboards can be downloaded to the device, making the SE Inspector an intelligent checklist of the people and jobs they need to witness. They can stop and witness several parts or witness work in several different areas, then return and upload the results. While out on call, they retain all of the functionality and can generate new records or modify existing records to include additional conditions.

Section 3
CIMLINC Product Overview
Single Source of Execution

Shop Excellerator (SE) bridges the gap between islands of automation by linking information systems, departments and people across the entire enterprise. It functions as an interactive electronic shop packet providing point-and-click access to current, accurate information from a variety of sources — CAD systems, inventory planning and control systems, product specification systems, document management systems, word processors and audio and video servers. Shop Excellerator enables everyone in the shop, from mechanic to plant manager, to be more productive, delivering quality services on time and on budget. SE effectively streamlines processes from shop order launch to customer delivery, resulting in faster throughput, increased manufacturing agility, improved product quality, reduced costs, minimal waste and maximum productivity. In short, lean manufacturing.

As we describe on our web site, www.cimlinc.com, our mission at CIMLINC is to evolutionize the shop floor by providing a mechanic-centric, compliance-focused solution that delivers point-of-work, ease-of-use benefits to the shop floor technician, while providing a performance-based value proposition to the enterprise.



SHOP EXCELLERATOR – Message to Management

Current studies show that up to 20% of sales or service revenue is lost to rework costs. However only a small amount, less than 5%, of this loss can be attributed to worker error. The remainder is inherent in the process that exists between Engineering Definition and Product or Service Delivery.

The challenge for the A &D community is to gain control of this process and improve procedural compliance while reducing costs. Of late the FAA and DOD have placed major emphasis on the Man Machine System with focus on Human Factors Initiatives. A system is required that:

- Provides accurate up to date information
- Facilitates communication
- Supports a disproportionate skills base
- Promotes knowledge through text and graphic combinations
- Enforces operational precedence
- Validates procedural compliance

E-Shopfloor is the system that meets these criteria and SHOP EXCELLERATOR Solutions is the enabling process and procedural compliance engine that drives it. What differentiates SHOP EXCELLERATOR Solutions from other shop floor information systems is an intuitive Touch & Go user interface. This interface is essential for ease of use and acceptance of information technology on the shop floor. Why is this so important?

Studies show that a majority of workers feel electronic work instruction delivery systems are no better than the paper based systems they were designed to replace. An alarming 33% feel they are more difficult to use. This induces complacency in the workplace and causes workers to bypass or shortcut the system. Work is performed based on tribal knowledge or past experience. Configuration changes are missed resulting in additional rework costs or increased compliance and safety risks.

To target cost, scrap, rework, compliance, and skill base concerns, a repeatable controlled process is required. A controlled process that ensures work is performed right “every time”, within budget, by any certified worker. The problem is that no matter how much is invested in process, without unsolicited participation on the shop floor, companies are at risk.

SHOP EXCELLERATOR Solutions breaks down all participation barriers by providing intuitive, easy to use interactive Workscripts that are facilitated with SHOPMAN Touch & Go user interface. The Shopman is specifically designed to meet the challenges of integrating the physical world and the information world. The interface is user friendly and inviting and provides a striking difference to Windows applications designed for office environments. SHOP EXCELLERATOR Solutions is designed with focus on the shop floor user and consists of three integrated systems – Author, Work and Resolve. Additionally, total SHOP EXCELLERATOR Solutions include Track, Manage and Inspector.

Author – Computer Aided Process Planning (CAPP) system used to construct easy to use interactive Workscripts with configuration control, and process validation points built in.

Work –Manufacturing / Maintenance Execution System (MMES) delivers Workscripts to the shopfloor that validate as-built data capture and process compliance and delivers this information to update ERP systems in real time.

Resolve –Nonconformance Management / Corrective Action (NCM / CA) system processes non-routine items and facilitates root cause corrective action to prevent reoccurrence.

Track – The compliance/parts tracking module provides a comprehensive as-maintained solution that includes complete event driven labor and material tracking, complete as-flow configuration data providing insight into maintenance tasks to be completed during scheduled checks, 8130 airworthiness information, ADs, SBs STCs and warranty performance.

Manage – Provides a complete suite of standard reports and provides easy-to-use tools to create ad hoc reports. These reports provide both local and web visibility into shop performance providing management visibility into activity-based costing, task performance and enhanced quality insights to achieve Six Sigma operations.

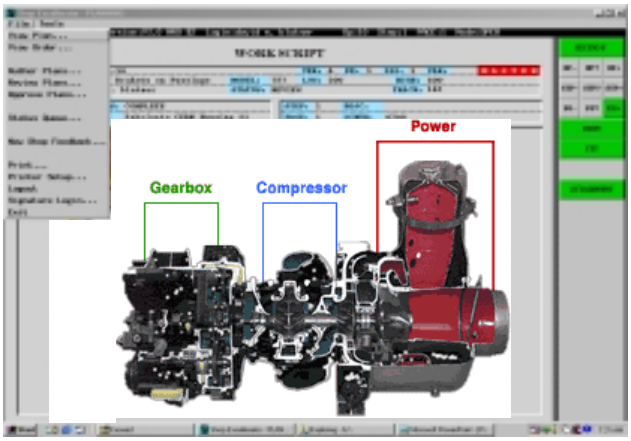
Inspector – Designed to be a complimentary nonconformance initiation and data collection tool. It provides simple and easy to use menus for selecting model numbers, defect codes, template types, etc.

Together these systems ensure repeatable process and procedural compliance, facilitate on time delivery, and allow any certified worker to complete jobs right the first time, every time and within budget.

SE Author

SHOP EXCELLERATOR's Computer Aided Process Planning system, SE Author, allows Process Planners and Manufacturing Engineers to construct workscripts in the same context as will be used on the shop floor. Process and Procedural Controls are included in the Workscript ensuring a repeatable controlled process. Benefits include:

Configuration Control	Ensures the right parts and instructions are being called out in the workscript.
Revision Control	Tools are provided that allow plans to be maintained by Version, Edition, and Issue.
Multimedia Support	Digital Photography, video, web content, and digital reference to blueprints, drawings, and specifications all combine to provide an information rich interactive workscript.
Planning Workflow	Management tools are provided to control and maintain workscript authoring and approval processes and to monitor the status of planning work in process.
Smart Text Components	Signature and data collection elements that are embedded within work instruction text. These components are maintained in a library and can be reused or shared among plans.
Markup Tools	Annotation tools are provided that enhance communication between authors and approvers as the workscript moves through its authoring process.
Quality Process Instructions	Workscripts can include quality process and tool usage instructions in addition to standard work instruction content. This provides all required content in one convenient location.
Structured Templates	Multiple templates are provided so the Author can choose the most appropriate for the operation. Examples include Text and up to four graphics, all graphics, all text, or any combination with a bill of material inclusion.
Graphics Format	SHOP EXCELLERATOR supports the following graphic formats: IGES 3.0 CGM 2.0 HPGL DXF TIFF Tiled TIFF CCITT-Group IV PICT Sun raster Xerox RLC PCX JPEG
User Profile Requirements	Within the work instruction, the author can specify minimum certification and skill level requirements required for each task. When executed on the shop floor, SHOP EXCELLERATOR Work will validate the user profile against the minimum task requirements.
BOM reconciliation	During the authoring process, SHOP EXCELLERATOR Author will validate that the bill of materials has been consumed.
Real Time Distribution	Upon approval plans are made available for generation of shop floor work orders.
Real Time Maintenance	With order status visibility into shop floor work in process activities, authors can determine where workscripts are in use and determine which need to be placed on hold for maintenance updates or revisions.



SE Work

SHOP EXCELLERATOR's Manufacturing / Maintenance Execution System, SE Work, provides multimedia rich work instructions that provide configuration compliance, process validation, real time data collection, and most importantly, beneficial usability for users on the shop floor. Users will discover added value and time relevant information when using SHOP EXCELLERATOR Workscripts. Benefits include:

User Profile Validation	SHOP EXCELLERATOR Work validates user profile at login and only presents work in the job queue for which the employee has the proper skills and certifications.
Real Time Data Collection	Data collection, approval signatures, and operation completions are collected as the work order is executed on the shop floor. This data is available in real time to facilitate Activity based Costing and ERP system updates.
Feedback Tools	Annotation text and drawing tools are provided for shop floor technicians to communicate errors and requested changes to planning support personnel. These annotations overlay text and graphic content onscreen so the technicians can pinpoint the areas of concern.
Shift Notes	An intra-shift tie in tool that greatly enhances the communication of work in process status between shifts.
Configuration Context	Workscripts are provided in configuration context to ensure the correct instructions, processes, parts, and tools are being used at the right time, at the right point, and on the right unit or assembly.
Repeatable Process	The key to cost and rework reduction is the application of repeatable processes regardless to worker experience. SHOP EXCELLERATOR provides repeatable process in spades. From process and procedural compliance validation to operational precedence enforcement SHOP EXCELLERATOR ensures a repeatable workscript process.
User Alerts	Users are alerted if the Workscript that they are executing has changed since the last time they viewed this content. They are required to review the changes prior to being granted the ability to proceed.
Text Graphic Combinations	Knowledge transfers is enhanced through text and graphic combinations. Up to four graphic images may be combined with text content and external graphic files may be retrieved with hypertext links.
Touch & Go Components	SHOP EXCELLERATOR cornerstone and key differentiator is its ease of use and acceptance on the shop floor. Facilitated with Touch & Go components all pertinent information is made available at the technician's fingertips. Useful and thoughtful presentation of information is made available and the user is not forced to process data for data's sake. Data capture and information processing is processed as a non-intrusive by product of normal workscript execution.
Labor Tracking	Labor collection is automatically captured as the technician executes the workscript. This information is fed to Labor accounting, ERP systems, and can be utilized for Activity based Costing down to the operation level.
Assign Work Queue	Technicians receive jobs in their work queue based on departmental assignment, skill, and certification levels. In addition the shop supervisor may assign specific operations or orders to individuals.
Tribal Knowledge	Technicians can make use of markup tools inherent in SHOP EXCELLERATOR to capture shop knowledge that may not exist in any written format. These markup documents can be provided to support organizations for inclusion considerations into the official work instructions.
Automatic WIP Notification	Upon operation completion, notification can automatically be sent to quality assurance and other support organizations via callboard, pager, or e-mail.

SE Resolve

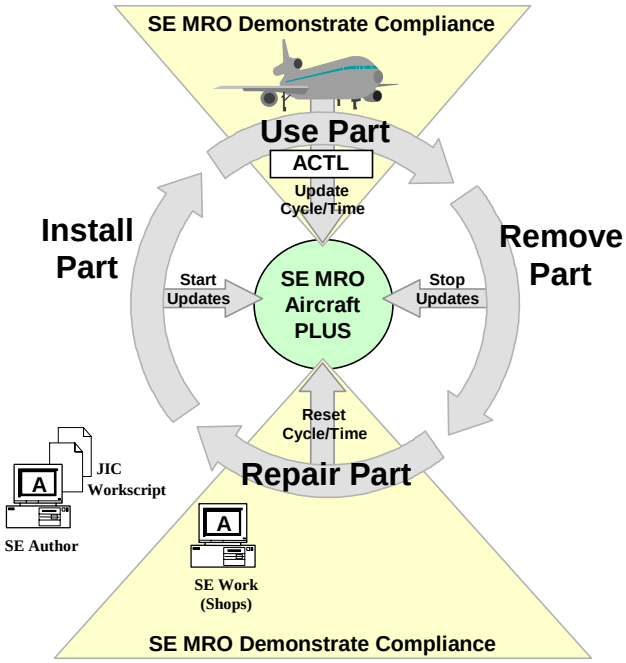
SHOP EXCELLERATOR's Nonconformance Management and Corrective Action System, SE Resolve, provides the tools required to keep production moving while addressing Root Cause Analysis and Corrective Action. With over 35,000 users of CIMLINC's 1st generation Nonconformance Management System, SE Resolve is the preeminent NCM / CA system in Aerospace and Defense today. Benefits include:

Order Closeout	When the original work order is complete and ready to be closed, SHOP EXCELLERATOR will verify that all nonconformance documents written against the unit or order have also been completed and closed.
Corrective Action	The goal of Quality Assurance is to prevent the repetition of any problem through corrective action. SHOP EXCELLERATOR Resolve provides all of the tools necessary to perform closed loop corrective action from root cause analysis and investigation to corrective action planning and validation.
Multi Unit Coverage	Because the same nonconforming condition can exist on multiple units tools are provided in Resolve that allow document effectivity coverage to be extended to those units. This prevents duplication of effort in document authoring and disposition.
Routing Capabilities	Standard document routings such as rework, repair, and material review board, are configured per site business rules. Then as documents move through the nonconformance process they follow these predefined minimum routings. Additional and ad-hoc routing destinations can be added as required as long as the minimum routing requirements are fulfilled.
Electronic Callboard	Technicians and shop supervisors have an electronic callboard at their disposals to request support from organizations such as Quality Assurance, Liaison Planning and Engineering, and Production Control. Instant notification and status feedback is provided when support is required on the shop floor.
Trend Analysis Codes	Customer trend analysis codes are loaded into SHOP EXCELLERATOR libraries and are available through pick lists as nonconformance documents are authored and dispositioned. This ensures that proper codes are available for selection so accurate and timely quality trend analysis can occur.
Fully Integrated	Resolve is fully integrated within the SHOP EXCELLERATOR system's suite. This provides visibility into order and document status and provides all the necessary tools for document, plan, and order creation in one convenient, easy to use system. For example, when a nonconformance is required, it is not necessary to reenter header information that is already available in the order header.
Document Navigation	It is easy to see and navigate the relationship that exists between orders, nonconformance, and corrective action documents.
Attach Graphics	Just as within Author, graphics can be attached to nonconformance documents as they are authored. Graphic attachments can be provided from existing files, are with proper equipment, a digital photo can be captured and attached in real time.
Markup Nonconformance	Annotation tools are provided so the author or disposition authority can pinpoint specific areas of text and/or graphics for clarity.
Part of Normal Job Queue	Nonconformance documents or orders to be worked appear in the normal job queue along with normally scheduled or planned activities. This allows shop management to properly schedule and prioritize all shop floor activity in one convenient location.

SE Track

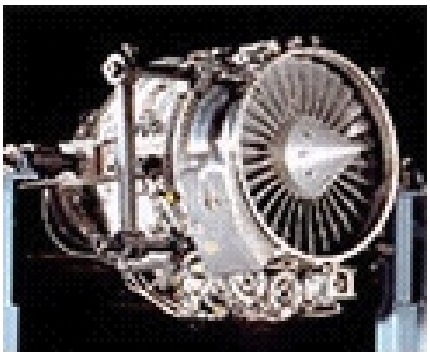
Compliance and Parts Tracking modules (Track) are tightly integrated with SHOP EXCELLERATOR's Author and Work modules to provide a commercial off-the-shelf solution required to demonstrate compliance and track aircraft parts limits, usage, and structure.

The Compliance module receives and catalogues Airworthiness Directives (AD), Service Bulletins (SB), and other action items. It manages the production of Engineering Authorizations and tracks the completion of work according to the Engineering Authorization's effectiveness.



The Author module produces plans for the performance of Maintenance and Engineering Authorizations. The Work module is then used to execute those plans. When plans are completed, the Work module communicates back to the Compliance module with notification of the completed Engineering Authorization or Maintenance event.

As parts are removed, installed, and made serviceable, operational data is provided to the Part Tracking module. This module makes use operation data to start and stop accumulating time on the component and to maintain the component's as-built configuration (note: for tracked components only). It also informs the Work module of any effectiveness problems or other component related issues concerning the performance of a given operation (e.g., install or remove contentions). The Part Tracking module also provides component usage information to the Compliance module, which is used by Compliance to determine if engineering authorizations are being completed within specified time frames.

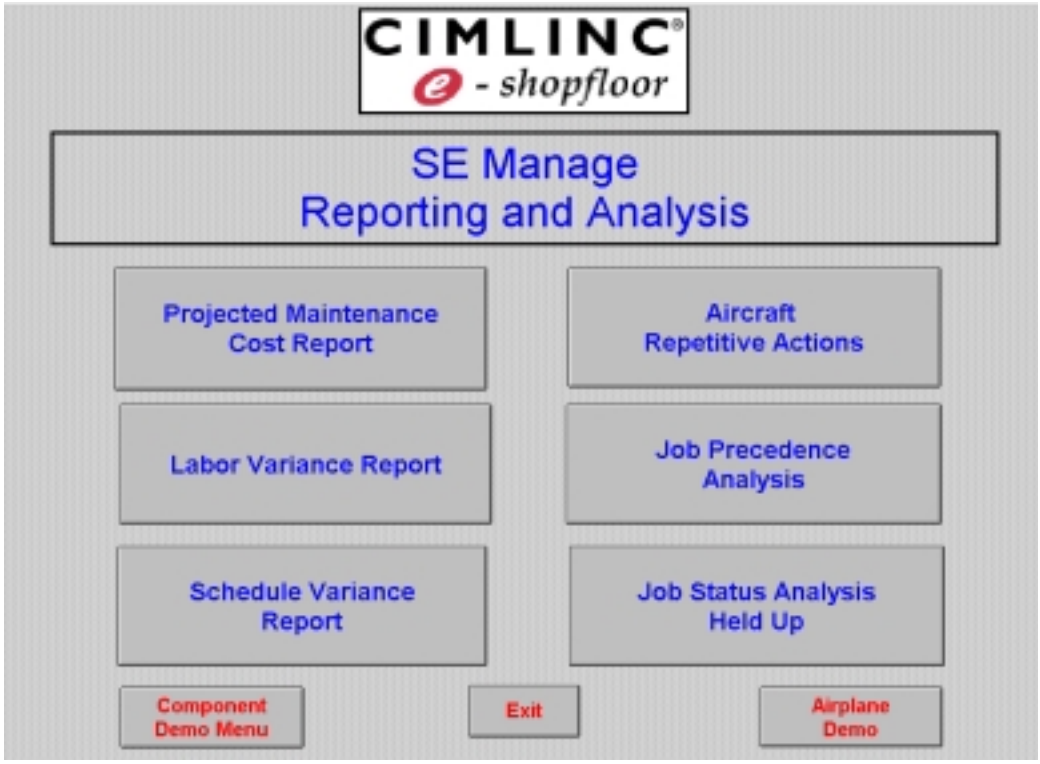


Now you will know where all component parts came from in your re-build process. Whether new, rebuilt, cleaned and replaced, components and/or rotables, along with all flight critical information of components used.

SE Manage

SHOP EXCELLERATOR's Manage module features two undisputed industry leaders for data mining, Impromptu and Power Play provided via our licensee agreement with Cognos Corporation. These two programs, working in unison with SHOP EXCELLERATOR's database, provide not only preformatted reports but also "what-if" analysis tools, which support all facets of your business operations. Whether your goal is to maximize your fleet's up time or to interject corrective action into the maintenance event for schedule recovery before it's too late, Manage empowers your organization to accomplish both of these goals. The Manage engine is mapped to the SHOP EXCELLERATOR database with the ability to pull additional information for it's "drill down" through the various levels you request. These reports are available to all of those who make business decisions, and can be supplied via Intranet, Internet (for your outstation locations), or Extranet (supporting your e-business client needs).

One such example of "drill down" would be in choosing a report showing the current maintenance costs associated with a specific aircraft model. By drilling down, you could view the unit cost of a specific aircraft APU or serial number. By drilling down further, you could view the specific costs associated with a maintenance task card or job instruction card. The database supplies the information necessary to make informed business decisions concerning your current operational performance, decisions that are necessary to react and respond to today's dynamic business environment. Additional provisions provide activity-based cost initiatives. Information used to manage and monitor quality and performance trends in conjunction with FAA compliance is also reports required to keep supporting your business needs.



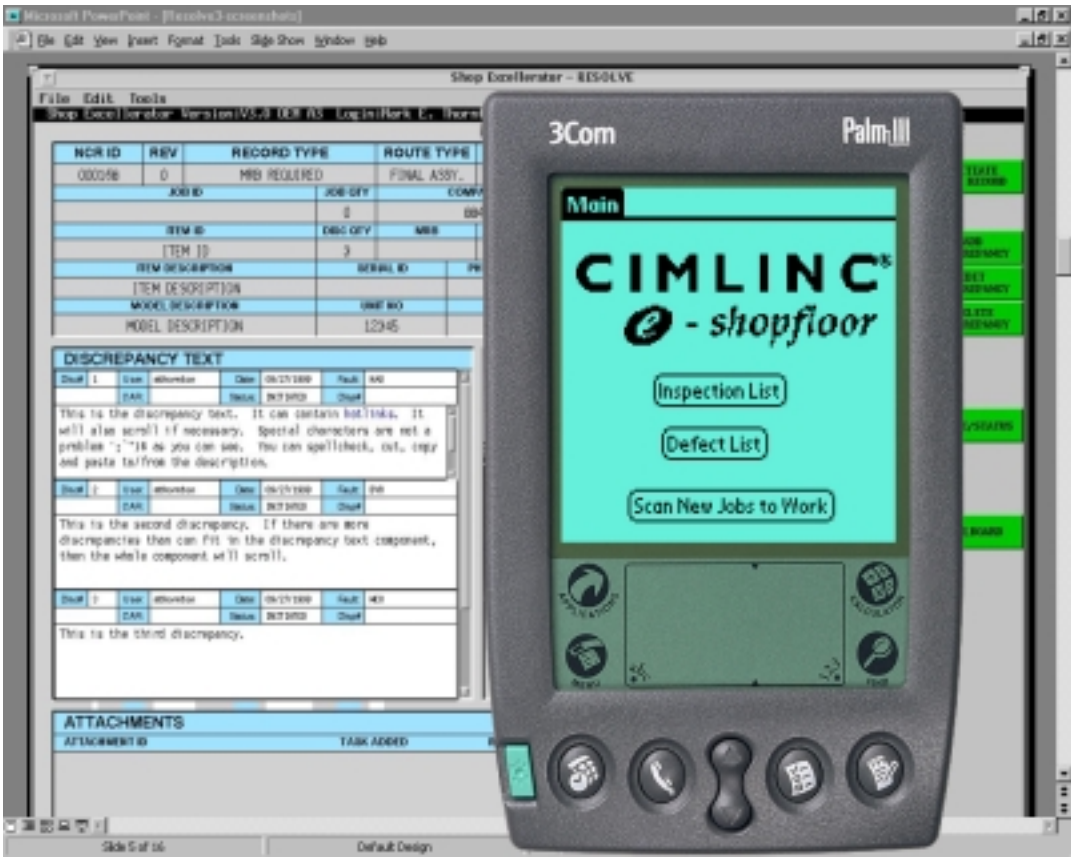
SE-Inspector

SE-Inspector provides a job queue of inspection report job numbers, and associated header information, and allows the user to select appropriate variable information and attach it to that inspection job. The job queue and associated information is initially synchronized with the handheld device and the end user adds value to the data. After completing a number of inspections, associating defect data and even barcode identifiers to selected jobs, the data is synchronized (uploaded) into SE-Resolve's data where it can then be worked further.

SE-Inspector is designed to be a complimentary nonconformance initiation and data collection tool. It provides simple and easy to use menus for selecting model numbers, defect codes, template types, etc. It also provides for text descriptions and allows the user to enter text using standard character recognition and floating keyboard functions. It also gives the user the option of scanning a barcode and associating that physical identifier with the electronic defect record.

SE-Inspector will execute on any PalmOS device, including low cost Palm Pilots, Handspring Visors, the Symbol Technologies 1500 series and the more costly Symbol Technologies 1700 series. It can also be ported, in the very near future, to Windows-CE.

Shopman Jr. has a built in scanner and is factory hardened, withstanding drops of 4 feet. It also has a built in Radio Frequency (RF) module allowing it to synchronize with a configured system, unattached from up to 300 feet away. Other typical methods for syncing include network cradles (stands with built-in connectors), serial port cradles, USB cradles and Infrared (IF) interfaces.



Section 4
Functional Characteristics

Description: Following is a functional view of the SHOP EXCELLERATOR Solutions, which include SHOP EXCELLERATOR, Track and Manage. The 5 core pillars of the SHOP EXCELLERATORs success (as outlined below) group these functional characteristics.

- **Work Instructions**
- **Process and Procedural Rules**
- **Data Collection and Navigation**
- **Problem Reporting and Resolution**
- **Management Tools and Process Mining**

Work Instructions – (easy to use, compound graphical documents, knowledge-driven information, and repeatable processes)

Routing/Steps/Sequences
SHOP EXCELLERATOR contains electronic work queues to manage workflow on the shop floor. Each queue has a configurable priority system that can be adjusted by supervision, or anyone having the function added to his or her profile. This ability to track parts through a process cycle to either due dates or a bill of material is easily integrated with scheduling systems to show impacts to, or make adjustments to schedule.

SHOP EXCELLERATOR can provide the Maintenance Planning and Scheduling System with all shop orders and routings for those shop orders for all modules, sub modules and parts associated with the hierarchy of any major assembly or subassembly. The routings will have standard times so that analysis can be completed within that system. It is possible that SHOP EXCELLERATOR could receive priority information from maintenance as a result of this analysis. SHOP EXCELLERATOR can also provide updates for actual starts and completions as work progresses. If the priorities cannot be transmitted electronically, the schedulers can manually modify shop order priorities in SHOP EXCELLERATOR. This feature is controlled with built in security levels.

Tooling Tracking/Control
SHOP EXCELLERATOR can be used to create tooling orders and thus the tracking and control of those orders can be contained within the system. Tools that are used in performing work can be validated against existing calibration systems. Electronic gauging devices can supply data collection requirements.

Work Instruction Delivery
SHOP EXCELLERATOR is an electronic work instructions system that provides all the necessary information for a mechanic to complete the work order process at his/her point of work – including graphical and visual illustrations of the work order process. When interfaced to an SGML/HTML and PDF type digital documentation system, SHOP EXCELLERATOR also has the ability to ensure that the latest revision dates of the engineering specifications (ESOs)/manuals are being utilized.

Process and Procedural Rules **–** (provide the ability to insure compliance of CFR 91, 121, 135, 145, ISO9000 and Six Sigma operations)

Document Management
SHOP EXCELLERATOR supports all document changes, specifications and processes. It records changes with respect to who accepts or rejects and allows that user to provide comments. The SHOP EXCELLERATOR accommodates different MPP plans, provides the ability to import vector and raster graphics, as well as video and digital photographs. An integrated 2D CAD drawing system allows for creation of manufacturing drawings as well as editing and engineering documentation. SHOP EXCELLERATOR provides standardization of all current hard copy forms while utilizing an online automated system to create and track the forms. A standard SHOP EXCELLERATOR product feature is the automation of the serviceable/unserviceable parts tag (8130) and Scrap Repair Authorization Tag (SRA) forms.

Procedural Compliance
SHOP EXCELLERATOR accepts input from external devices such as RF, bar code readers, data collection devices and computerized measuring devices. SHOP EXCELLERATOR enforces procedural compliance for both serial and parallel operation formats. This validation verifies that all signature, buy off, and data collection processes contained within the operation are complete before order closures.

Production Dispatch
SHOP EXCELLERATOR can be configured to provide dispatch support or interface with the MRPII or ERP system to accomplish all of the defined requirements.

Quality Management
SHOP EXCELLERATOR's Resolve component is our quality management system that provides nonconformance/non-routine document control that limits access to authorized personnel. This is a configurable item to meet your requirements. It provides the capability to collect key characteristic data for export for analysis by an SPC system.

Security/Certification Control
System Security is facilitated through User Profiles that define restrictions and permissions granted to individuals and user groups. Application of these profiles ensures that only authorized individuals have the ability to carry out specific or combinations of SHOP EXCELLERATOR processes. Process examples include buy off, approval, editing, authoring, administration, data collection and so on.

Shop Floor Control
Functionality inherent within SHOP EXCELLERATOR allows for the shop floor control in respect to standard work packages. It also provides data necessary for the pre-pull of parts as needed for modifications, ECOs, SBs, ADs or FCDs when a bill of work is created.

The Shop Floor Control queue provides managers with a list of all orders and their current status. This list can be filtered to reduce its size and can be sorted by any column title. The list content is established during implementation. Standard out of the box list content includes Plan ID, Manufacturing Order Number, Due Date, Order Status, Location, Area, and Sub Area. For example, Shop Floor controls can drill down to view the supplier part number of a specific unit, and further by labor, employee, work order, etc. to meet all of your control needs.

Data Collection and Navigation – (provides the ability to find and record information, extract data as a by-product of normal shopfloor activity, enable activity-based costing and provide real-time data collection)

BOM/Parts List
SHOP EXCELLERATOR provides the capability to identify all parts for the next higher assembly and will automatically track all material used in the repair process. It establishes a relationship between material usage, new orders and workload on any form used as the work document. It provides a real-time interface with the applicable Maintenance and Engineering systems.

Cost Collection
SHOP EXCELLERATOR, as a standard feature, captures the expenditure of all labor and materials expended against a given work order. This accurate and real-time data can then be utilized to capture all costs related to the repair overhaul test of engines and components. SHOP EXCELLERATOR utilizes this same data for tracking and reporting performance on labor, material and outside services relative to the budget.

Data Acquisition
SHOP EXCELLERATOR has a standard feature of data acquisition capabilities. Database maintenance panels provide the ability to add additional data to database tables or edit existing values. Examples include the creation and maintenance of skill code and work center location information. As orders are executed on the shop floor, SHOP EXCELLERATOR Work validates data as it is collected. If data falls outside the prescribed limits the operator is notified.

Information Technology
SHOP EXCELLERATOR provides the interfaces necessary to ensure the accuracy and integrity of shared production data -- specifically AOS, Automated Time and Attendance Scheduling, TEO Scheduling, CMAC, TWD, accounting control, purchasing, inventory and supply control, and human resources/payroll system. CIMLINC has already demonstrated this capability. Additionally, SHOP EXCELLERATOR collects the highly accurate, real-time labor and materials utilization data necessary for Maintenance and Engineering financial billing purposes.

Data, archival and recovery functions are standard functions. Comprehensive users guides are available via CD-ROM in HTML format and can be delivered in standard product or customized to user requirements. Training is provided for all levels of user groups.

Machine Interface
SHOP EXCELLERATOR has the ability to import and launch CNC and DNC controlled devices as well as edit and save NC tape files.

Serialization/Lot Traceability
Serial numbers are standard SHOP EXCELLERATOR search criteria. SHOP EXCELLERATOR's parts tracking module provides visibility to serialized parts anywhere in the system. A system user to support WIP prioritization can query the life limits of a serialized part. SHOP EXCELLERATOR provides the ability to track non-serialized parts by use of the shop order number. Unique identifiers can also be assigned to provide full-time tracking of these parts.

Shipping
SHOP EXCELLERATOR provides visibility into real-time status of activities, scheduling deliveries, inventory and aircraft availability requirements.

Time & Attendance
SHOP EXCELLERATOR tracks all direct labor as a natural by-product of performing work activities. If the labor involved exceeds normal limits, AUTOTA will be used to determine the overtime involved. By integrating with time and attendance, SHOP EXCELLERATOR can then easily identify what employees and the exact hours that were worked and matched against those that are overtime hours.

Problem Reporting and Resolution – (provides logic and electronic maintenance and tracking to non-conforming and non-routine actions to maintain activity/schedule flow)

Reporting
SHOP EXCELLERATOR contains many real time reports with varying views, including query capability within standard reports. These reports are easily configurable depending on customer needs. SHOP EXCELLERATOR's Oracle database is easily integrated with any enterprise data warehouse for use with the most common reporting tools.

Reports are available via the web browser. Web-based reports include the ability to drill down to lower levels. For example, if a report shows the cost of various models, the user can drill down to view the unit cost of a specific model by labor, employee, work order, WIP, etc. to meet all of your reporting needs.

Management Tools and Process Mining: – (provide report information of work in progress as well as trend process analysis to manage cost and provide on-line/internet-accessible reporting)

Labor Management
SHOP EXCELLERATOR integrates labor reporting, instructional content and other data collection into the same graphical user interface. Real-time labor reports are available in SHOP EXCELLERATOR with drill down capability to the task level. SHOP EXCELLERATOR can be interfaced to most time and attendance systems. Labor data capture is non-intrusive to the shop floor user and can be segregated by setup and run standard hours. By simply completing operations or tasks and proceeding on to the next operation or task, labor hours are captured and allocated appropriately. This facilitates accurate time charges and allows activity based costing at the operation level.

Maintenance Management
While maintenance management is not a core component of the application, the software language could be developed to accommodate your requirements. SHOP EXCELLERATOR can interface with the current legacy scheduling system to collect setup and queue time and aid in forecasting requirements for machines and manpower in order to enable prioritization.

Metrics
SHOP EXCELLERATOR's database provides for reporting metrics that will support all your organizations needs.

Performance Analysis
SHOP EXCELLERATOR's Manage component provides reporting capabilities that will meet or exceed all of your organizations needs.

Process Management
SHOP EXCELLERATOR's work execution is regulated by user profile work center sequential or non-sequential operations. It provides the user the ability to report status of completion or interruption and supply comments as necessary, as well as notify individuals of inactivity or items requiring attention.

Product Tracking
SHOP EXCELLERATOR can automatically point to any given part at any given time – i.e. what work center currently is repairing the part, the status of the work, that the work has been completed and its next location/work center. Any work center can query ahead as to when a part will be received in that work center in order to prepare for the repair of that part. Reports can be generated that identify shop orders expected to arrive in a work center within a specified period of time.

The Shop Work in Process queue provides managers with a list of all orders and their current status. This list can be filtered to reduce its size and can be sorted by any column title. The list content is established during implementation. The standard out-of-the box list content includes Plan ID, Manufacturing Order Number, Due Date, Order Status, Location, Area, and Sub Area.

Resource Allocation
SHOP EXCELLERATOR is fully integrateable to capacity resource planning systems as well as ERP capacity forecasting and monitoring systems. Once the resource is engaged within the SHOP EXCELLERATOR system, the status is exportable for analysis by the previously mentioned systems.

WIP Tracking/Control
In the SHOP EXCELLERATOR Work system (MES), shop floor managers can use the WIP panel to change order status. For example, they can change the status of an order from in-work to on-hold. With interfaces to Purchasing, Inventory, Control and Supply, warehouse and backorder quantities can be added to standard WIP queries.

The Shop Work in Process queue provides managers with a list of all orders and their current status. This list can be filtered to reduce its size and can be sorted by any column title. The list content is established during implementation. The standard out of the box list content includes Plan ID, Manufacturing Order Number, Due Date, Order Status, Location, Area, and Sub Area.

Implementations
CIMLINC has implemented a similar system at Delta Air Lines. The knowledge and experience gained from this relationship will ensure a successful implementation at your company. SHOP EXCELLERATOR is modular and as such can be safely implemented in risk-reduced phases. In other words, it is not an all-or-nothing approach—even at a specific maintenance location.

Section 5
Shop Excellerator Frequently Asked Questions and Requirements

- **How is the system used to describe how to fabricate the chambers, e.g. a work instruction?**

✓ SHOP EXCELLERATOR Author is a Computer Aided Process Planning system used to create work instruction plans. The author is provided tools that allow them to create work instructions in the same context as will be displayed on the shop floor. This is to say that what the author sees is exactly what the technician will see.

- **System must be "user-friendly" for the operators to use with minimal training and headaches.**

✓ SHOP EXCELLERATOR addresses “Human Factors” issues by providing an easy-to-use graphical user interface. Additional interface enhancements are provided with SHOPMAN Touch & Go Components. These components allow the shop floor technician to drive the software with one finger placed on SHOPMAN’s touch screen. Software navigation is intuitive and where necessary, wizards are provided to give guidance. Training for everyday users is 2 to 4 hours, and training for power users is 4 to 8 hours.

- **System links to a database so that the information that is gathered during fabrication is put into a database real-time.**

✓ Labor Information and Data Collection occur in real time in the SHOP EXCELLERATOR database. This provides access to real time Work in Process Status and Activity Based Costing. During implementation interfaces can be built to external systems such as ERP and labor accounting to provide these systems with data in real time or though regularly scheduled batch processes.

- **System must include a database for specifications, and the traveler would "lookup" the spec when the operator inputs the data.**

✓ There are two types of specifications in SHOP EXCELLERATOR, external reference documents such as process specifications, and attribute or tolerance specifications that define the product requirements. The attribute or tolerance specifications are incorporated as the plan is authored. Then, as the plan is executed on the shop floor and a data entry is made, the application compares the entry to limits specified in the database.

- **Database must have version control for specifications.**

✓ If limit or tolerance specifications are defined as Smart Text Components, they are version controlled and changes are reflected in all plans or future plans that use the revised component. If the limits are plan specific, version control rolls up to the plan version control process. This means that a change to the limit would cause a plan revision or version change.

- **In the event that a datum is out of specification, the system must flag the operator to inform him/her that the datum is out of spec.**

✓ Limits such as control, dimension, temperature, etc. are established during plan authoring processes. These limits can be set for a specific plan or can exist in Smart Text Components, which are shared by multiple plans. As orders are executed on the shop floor, SHOP EXCELLERATOR Work validates data as it is collected. If data falls outside the prescribed limits the operator is notified.

- **The flag must "force" the operator to initiate a DR; therefore, the system must link to the DR system.**

✓ Upon notification that collected data is outside limits defined by the plan, operators first have the option of correcting clerical errors. The next step is defined by the following software configuration options:

Outside Limit Notification Options:

Option 1	Notify the operator and allow the operations to continue.
Option 2	Require the operator to initiate a nonconformance/request and allow operations to continue.
Option 3	Require the operator to initiate a nonconformance/request and place the operation on hold.
Option 4	Automatically initiates a nonconformance/request and allows operations to continue.
Option 5	Automatically initiates a nonconformance/request and places operation on hold.

These options are further defined by business rules affecting the authorization level required to initiate a nonconformance. For example shop floor technician versus quality assurance technician. The request or initiation of the nonconformance is facilitated in SHOP EXCELLERATOR through tightly integrated Work (manufacturing execution system) and Resolve (nonconformance management and corrective action system) modules.

- **System should not allow the operator to continue (without the proper authorization).**

✓ See note above.

- **System must be easy to maintain: A non-programmer should be able to create/revise a traveler with minimal training (the time is takes to create a traveler in MS-Word is the benchmark).**

✓ Plan creation is easy and is facilitated through the use of standard libraries and authoring tools. For example it is easily possible for a non-programmer to incorporate hyper links to external documents through SHOP EXCELLERATOR wizards.

- **System should "auto-number" when a step is added or removed.**

✓ Options are available at the time of edit to automatically renumber steps as they are added and/or removed, or to insert a specific step number such as 5.5 between steps 5 and 6. It is also possible to designate the increment between automatically generated step numbers.

- **"On-the-fly" changes to the traveler should be simple to do (analogous to the hand-written changes to the paper document).**

✓ Tools are provided that make it easy for authorized users to revise orders (travelers) on the shop floor. They are able to review the order status, place it on hold, revise any operation that has not already been completed and release the order back into active status.

- **Changes for one or two chambers should be allowed (this allows for a couple of chambers to be made differently than the others, and then you go back to "normal" production).**

✓ SHOP EXCELLERATOR build conditions allow plans to contain specific information based on product options, repair codes and product configurations. When orders are generated against the plan, operations within the order will prescribe work instruction content appropriate for the unit configuration. This allows issuance of orders that deviate from normal production without requiring special attention or handling.

- **The software must be reliable, i.e. "bug-free" so that it does not add complexity/headaches to the fabrication process.**

✓ SHOP EXCELLERATOR is fully tested prior to release as part of its software lifecycle process. It also goes through complete configuration and integration testing when it is installed at a customer site to alleviate any problems associated with implementation.

- **The hardware must be easily maintained. This could include laptops, desktops, IR transmitters/receivers. This means that our CIS group must have the resources to maintain the system.**

✓ CIMLINC's hardware offering, SHOPMAN, is due for release in early 2000. This is a Point of Work Computer that the technician can take right to where the action is. It provides a Touch & Go Interface that eliminates the need for keyboard and mouse.

Two components, the display module and the intelligence module, constitute a complete SHOPMAN system and maintenance couldn't be easier. If the display fails simply utilize the optional spare unit and mail the failed unit back for service. If the intelligence module fails, simply hot swap the optional spare card, drop the failed card into an envelope and send it back for service or replacement. Maintenance is easy and on staff personnel can accomplish troubleshooting activities.

- **If the network is down, the system should still be able to operate in "standalone" mode.**

✓ CIMLINC Professional Services addresses implementation configuration and data replication requirements on a customer by customer basis. In general, SHOP EXCELLERATOR can withstand failure of a Wide Area Network if, for example, the customer is operating with replicated data between multiple sites. However, because of the real time nature of processes such as work-in-process status, revision control, certification validation, and data collection, the application relies on communication with the database.

- **System must have security such that only the appropriate persons are allowed to make changes to the traveler.**

✓ System Security is facilitated through User Profiles that define restrictions and permissions granted to individuals and user groups. Application of these profiles ensures that only authorized individuals have the ability to carry out specific or combinations of SHOP EXCELLERATOR processes. Process examples include buyoff, approval, editing, authoring, administration, data collection, etc. Therefore, if a user does not have the proper profile, they will not be able to enter into an edit mode.

- **System must have a method of maintaining a revision history for the travelers (it can't just overwrite the previous traveler when it is revised).**

✓ Previous plan versions are stored and are not overwritten.

- **Revision history must also allow for the completion of the previous traveler and chamber (because the chamber is already being fabricated) while the next revision is being issued for use.**

✓ When an order (traveler) is released to the shop floor, an order specific copy is made of the original plan at its present revision level. This order specific plan can then be executed through to completion on the shop floor even though the original plan may be undergoing additional revision processes. All revision levels of the original plan are maintained in the database for future reference or release of the same revision configuration.

- **System must allow for the issuance of a previous version of the traveler.**

✓ All plan revisions are maintained in the database for future reference and/or issuance of an order (traveler) of the same revision configuration.

- **System must be able to "cross-check", which means that one process cannot start unless a previous process has been completed (and all DR's are closed), e.g. can only begin the collaring process after the coil has been wound.**

✓ SHOP EXCELLERATOR validates that the current serial operation or group of parallel operations is complete before allowing the user to proceed to the next operation. This validation verifies that all signature, buyoff and data collection processes contained within the operation are complete.

✓ SHOP EXCELLERATOR validates that all operations and nonconformance documents are complete before allowing an order to be closed.

- **System must allow the operator to complete steps that are later in the process before previous steps are completed, e.g. steps 10-20 take a while to complete by the machine, and steps 21-30 do not depend on the previous steps, and so they can be worked on at the same time as 10-20.**

✓ SHOP EXCELLERATOR provides complete precedence control for serial and parallel operations. Operation precedence is defined as the plan is being authored. Operations that are set up in serial precedence must be performed in that order as the plan is executed on the shop floor. With proper user authority, a work around is allowed. This is to facilitate unforeseen events such as part shortages or resource constraints. Operations that are set up in parallel can be executed consecutively. For example, if operations have different task duration, skill or equipment requirements, the software allows them to be worked at the same time. However, all parallel operations that feed into a single serial operation must be complete before that serial operation may be started.